ORIGINAL ARTICLE

"With a Guide I have Control": Rural Filipinos' Perceptions of a Diabetes Learning Module on Regimen Adherence

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ABSTRACT

Background and Objective. The challenges faced by patients with diabetes in rural Philippine communities highlight the need to look into how we can improve ways of communicating health education and self-management strategies. Patient education materials play a vital role in promoting regimen adherence, yet their acceptability and effectiveness in resource-limited settings remain insufficiently investigated. Therefore, this study aimed to explore participants' experiences with and perceptions of a community-based diabetes learning module through qualitative inquiry.

Methods. Using purposive sampling, 13 participants who successfully completed the Blood Sugar *Bantayan*, Diabetes *Malikayan* pilot health program from January to July 2022 in a rural community in southern Philippines consented to engage in in-depth interviews. A semi-structured topic guide was developed, validated by experts, and pretested. Interviews were conducted in the local language, audio-recorded, transcribed, translated, and analyzed using Braun and Clarke's reflexive thematic approach.

Results. Five major themes emerged from the analysis: initial perceptions of the module, aspects of the module found useful, perceived impact on regimen adherence, hindrances to adherence, and overall feedback with likelihood of recommendation. Participants valued the module's visual appeal, use of local language, and comprehensive coverage of diabetes management. The module served as a guide that enabled participants to gain better control over their condition through improved self-discipline and health practices, often motivated by family support. However, challenges including time constraints, resource limitations, and competing priorities affected consistent implementation of recommended practices. Despite these barriers, participants expressed strong satisfaction with the module and willingness to share it with others, though sharing decisions were often based on perceived relevance to others' health status.

Conclusion. Community-based learning modules can serve as valuable educational tools for diabetes care in rural Filipino communities. Findings underpin the importance of developing culturally appropriate and responsive campaigns for diabetes education in remote environments, but multi-modal strategies that cut across sectors are still imperative to address persisting structural factors that pervade health program efforts.

Keywords: behavior change, cultural competency, health education, health promotion, patient education materials, patient empowerment, rural health

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INTRODUCTION

Diabetes is a prevalent, chronic metabolic disorder that carries substantial implications for public health. The World Health Organization estimates that about 422 million people globally have the condition, with the majority living in low-and-middle income countries.[1] The surge in diabetes cases is attributed to a combination of genetic predispositions and environmental factors, notably lifestyle choices, sedentary behaviors, obesity, aging, and the effects of modernization.[2] This trend necessitates effective educational interventions, particularly in resource-limited settings where access to diabetes education and support may be restricted. In the Philippines, the International Diabetes Foundation (IDF) estimates an 8.2% prevalence among adults, a number expected to rise to 9.6% by 2030.[3] This increasing prevalence highlights the critical need for contextually appropriate educational interventions that can effectively support diabetes self-management in Filipino communities.

Patient education and support play vital roles in diabetes management and in promoting regimen adherence. Adherence is described as the "extent to which the patient's behavior matches agreed recommendations from the prescriber."[4] Patients may unintentionally or intentionally fail to adhere to their pharmaceutical (e.g., medication) or non-pharmaceutical (e.g., diet or lifestyle) regimens due to various factors. For instance, inadequate training on preventive measures, such as foot care, can contribute to poor adherence to self-care behaviors.[5] These factors underscore the complexity of patient adherence and call attention to the importance of tailored approaches to enhance patient engagement and treatment outcomes. Consequently, the American Diabetes Association suggests that individuals should undergo diabetes self-management education and support to develop and maintain behaviors in coping with diabetes.[6]

In 2022, researchers from southern Philippines conducted the *Blood Sugar Bantayan, Diabetes Malikayan* [Monitor Blood Sugar, Avoid Diabetes (BSBDM)] pilot health program for adults residing in a rural community.[7] A key component of this program was the development and implementation of a culturally tailored learning module aimed at enhancing diabetes education and self-management support among rural Filipino adults. Learning modules, in particular, are essential components of outcome-based adult learning programs, enabling learners to acquire knowledge and develop relevant skills and competencies.[8] Several studies have evaluated learning modules for diabetes education, yielding positive results.[9,10] One example by Jamil and collaborators demonstrated that a comprehensive nutrition and health education module on diabetes and periodontitis in the local language garnered significant acceptance among their target demographic.[11]

However, there is scarce information on the acceptability and perceived effectiveness of diabetes learning modules within the Philippines, especially in the rural context. Understanding how rural Filipino adults perceive and engage with such educational materials is crucial for developing more effective diabetes education interventions. Therefore, this study aimed to explore participants' experiences with and perceptions of the BSBDM's community-based learning module through qualitative inquiry. The specific research objectives were to:

a. Examine participants' initial perceptions of the learning module;
b. Identify aspects of the module that participants found most useful;
c. Explore the perceived impact of the module on participants' diabetes regimen adherence;
d. Investigate barriers and obstacles to adherence encountered by participants; and
e. Gather overall feedback and assess the likelihood of participants recommending the module to others.

Findings gained from this undertaking could further inform the development of localized interventions to promote better diabetes regimen adherence strategies within similar communities.

METHODS

Research Design

This qualitative evaluation study sought to understand participants' experiences with and perceptions of the community-based learning module. The study was guided by a phenomenological approach, which aims to explore lived experiences and interpret the meanings that participants attribute to these experiences.[12] The protocol was approved by the University of the Philippines Manila Research Ethics Board (protocol number: UPM REB 2022-0589-01).

BSBDM Learning Module

The BSBDM was a pilot health program spearheaded by faculty-researchers of a higher education institution in southern Philippines. Detailed methods and results of the program have been documented elsewhere.[7] In brief, BSBDM is a non-pharmaceutical-based diabetes health education and promotion program that aimed to increase the knowledge, attitude, and practices while fostering improved adherence to diabetes regimens among adult residents of the community. As an integral component of the program, a multidisciplinary team of healthcare professionals – including medical doctors, nutritionists, and physical therapists – collaborated with *barangay* (village) healthcare workers to craft a culturally sensitive and responsive learning module tailored to the needs of the focus population (Figure 1). The program followed a structured timeline: baseline assessments were conducted in January 2022, followed by the implementation of the intervention phase from February to June 2022, which included diabetes lectures, distribution of learning modules, physical exercises, and nutrition counseling. Follow-up

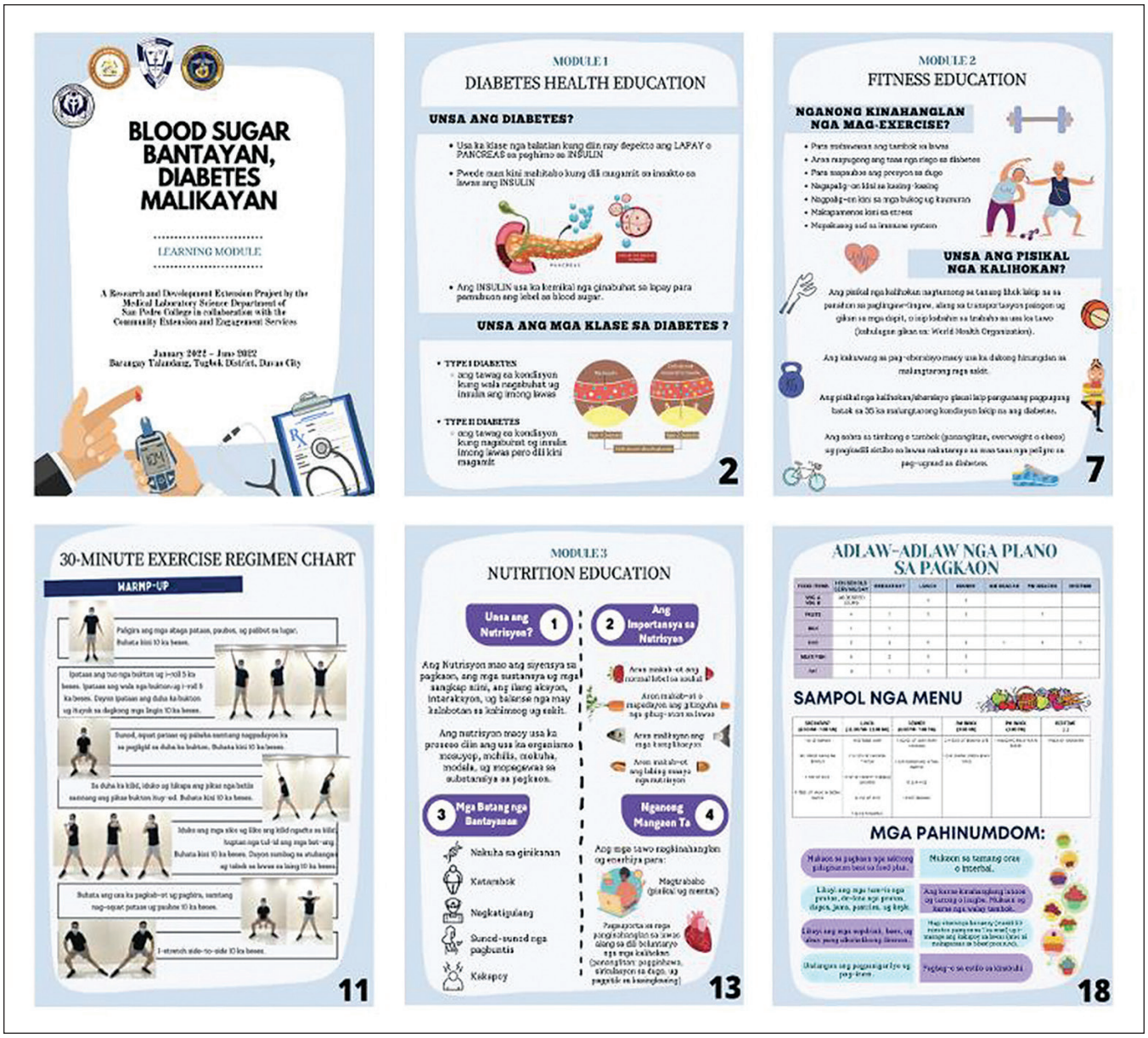

Figure 1. Representative pages of the BSBDM community-based diabetes learning module.

assessments were then carried out in July 2022, allowing for a six-month period between the initial and final assessments to observe potential changes in outcomes.

The development of the learning module underwent an iterative process, wherein feedback from stakeholders and subject matter experts was incorporated at each stage. It was divided into three parts for the topics on diabetes education, fitness education, and nutrition education aspects. There were 19 subtopics that were principally framed as a question to incite curiosity among readers. The learning module had 25 pages in total, all printed in color, and written in the vernacular Bisaya. On the Flesch-Kincaid readability test, it scored 50.5 on the reading ease scale with a 7.2 reading level interpreted as 10th to 12th grade (high school), aligning with the reading level of most of the participants who were able to finish secondary school. The learning module also included practical examples of exercise activities that were previously demonstrated and performed by a licensed physical therapist together with the participants.

Moreover, personalized nutrition meal plans that were easy to follow were introduced during individual counseling sessions. The learning module also covered risk factors for diabetes development, signs and symptoms, potential complications, as well as methods for treatment and control. Each participant received a copy, enabling them to share it with family members at home, thus extending the module's reach to a secondary audience. Prior to implementation, the module underwent face validation, where experts provided

invaluable comments to refine its content, ensuring accuracy, clarity, and cultural relevance. The overarching goal of this module was to educate and emphasize the criticality of adhering to diabetes regimens to mitigate the risks of complications associated with the condition. The breakdown of contents included in the learning module is presented in Figure 2.

Sampling Design

Participants were selected using purposive sampling based on two criteria: 1) successful completion of the BSBDM program and 2) consent to participate in the in-depth interviews. Of the 22 program participants, 13 agreed to participate in the interviews, while others were unavailable due to conflicting schedules. The sample size was determined

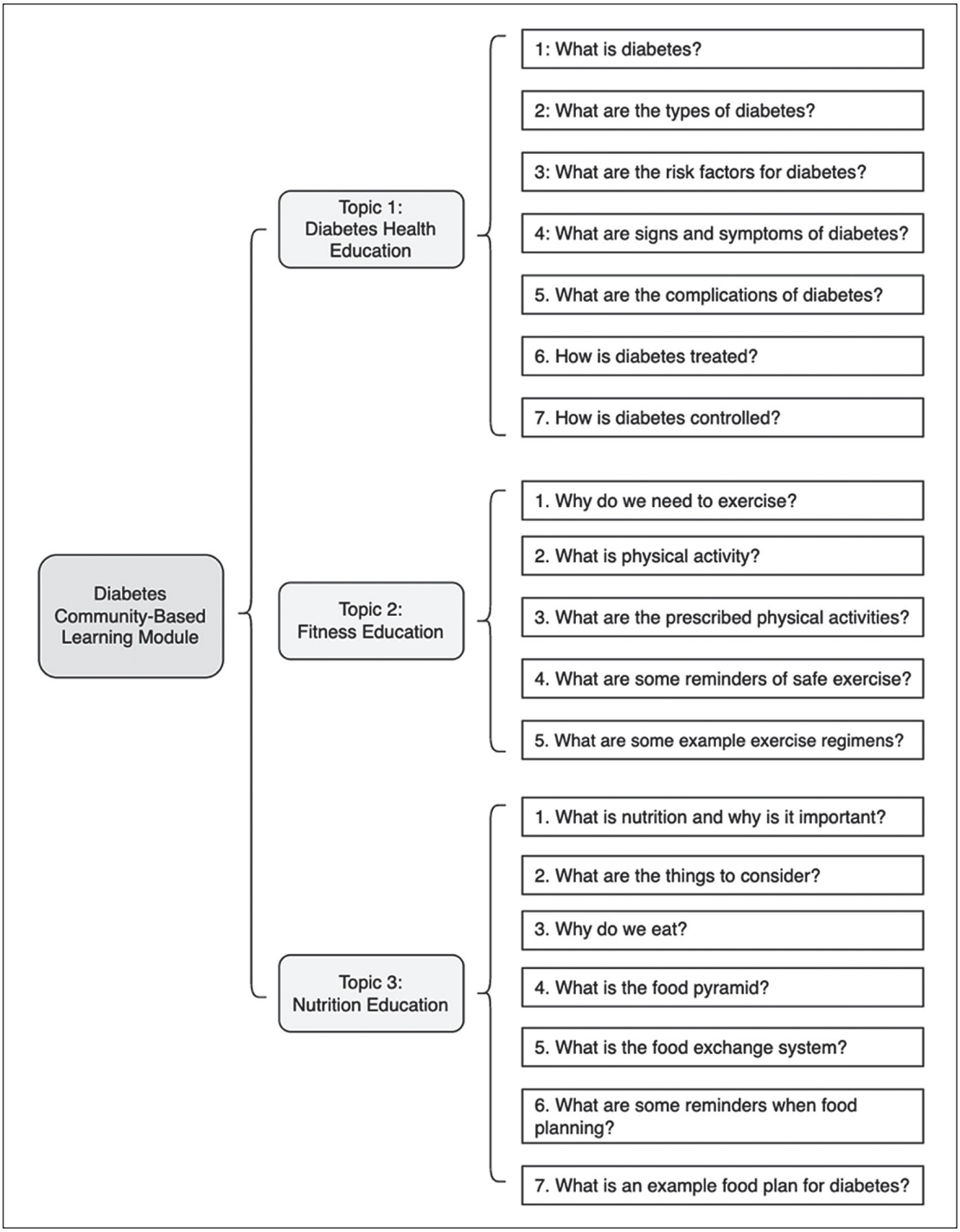

Figure 2. Breakdown of topics and subtopics in the community-based learning module.

to be adequate when data saturation was reached, with no new themes unfolding from the interviews.[13]

Interview Guide Development and Administration

A semi-structured topic guide was developed based on the study objectives and relevant literature on diabetes education interventions. The guide consisted of five main sections corresponding to the research objectives: initial perceptions, useful aspects, perceived impact, barriers to adherence, and overall feedback. Questions were designed to be open-ended to encourage rich, detailed responses from participants. The tool also underwent expert validation by two qualitative research specialists and was pretested with three individuals with similar characteristics to the target population but who were not part of the final study sample.

Based on the pretest results, minor revisions were made to improve question clarity and cultural appropriateness. All interviews were conducted in Bisaya, the local language, to ensure participants could express themselves comfortably and naturally. A barangay health worker was present during interviews with older adults, and family members were allowed to be present if requested by the participant. Interviews lasted approximately one hour each and were conducted in locations chosen by the participants to ensure their comfort and convenience. All interviews were audio-recorded with participant consent.

Data Collection and Processing

Individual face-to-face interviews were conducted by the first author, who is a medical technologist and Doctor of Public Health candidate, assisted by trained research staff. Verbatim transcriptions in the local language were used to ensure accuracy, with codes supported by an initial codebook containing predefined notations, terms, and acronyms to streamline the interview coding process. To safeguard confidentiality, anonymized transcripts were utilized, each assigned a unique participant number. All data were safely secured in an encrypted cloud storage system and were treated in accordance with the implementing rules and regulations of the Data Privacy Act of 2012.

Data Analysis and Interpretation

The analysis followed Braun and Clarke's reflexive thematic approach, acknowledging the active role of the researchers in the interpretation process.[14] The first author and second author (a nurse and Doctor of Public Health professor) independently reviewed the first three transcripts to establish initial codes. Regular debriefing sessions between the authors allowed for discussion of emerging themes and resolution of any coding discrepancies. The researchers acknowledge that their backgrounds influenced the analysis process. The first author's experience as a medical technologist provided insights into the technical aspects of diabetes management but required conscious effort to focus on participants' lived experiences rather than clinical outcomes. The second author's extensive experience in public health research and community interventions helped ensure that the analysis maintained a population health perspective while remaining grounded in individual experiences.

The coding process drew from Saldaña's Coding Manual for Qualitative Researchers, employing a two-cycle approach.[15] The initial cycle involved descriptive coding, process coding, and sub-coding, while the succeeding cycle focused on reorganizing and reanalyzing data derived from the initial coding phase. Codes generated in the first cycle were grouped based on similarities, facilitating multi-level data analysis and resulting in a condensed list of broader categories or themes. Through an iterative approach, codes were continuously refined and further subdivided during both data collection and analysis stages. Subsequently, global themes were identified from the coded transcripts and analyzed using NVivo 14 software for macOS. Primary themes and supporting statements were then extracted from interview transcripts and translated into English.

Translation validity was ensured through back-translation by a bilingual researcher not involved in the initial translation. Several strategies were employed to enhance trustworthiness. First, peer debriefing was conducted through regular discussions with external qualitative researchers to validate arising interpretations and analytical decisions. Second, an audit trail was maintained through detailed documentation of all coding decisions, theme development, and analytical processes. Third, reflexivity was practiced through regular reflection on how researchers' backgrounds and assumptions might influence interpretation. The researchers acknowledged how these perspectives could shape their understanding and interpretation of participants' experiences with the diabetes learning module.

RESULTS

Participant Characteristics

Table 1 shows the socio-demographic profile of the participants of the study. Of the 13 interviewed, the majority were female (n = 11), with ages ranging from 45 to 88 years old. Most had completed secondary education (n = 7), were married (n = 12), and identified as Catholic (n = 11). About half of the participants were unemployed (n = 7). These characteristics reflected the broader demographic profile of the rural community where the study was conducted.

Qualitative Findings

Analysis of interview transcripts revealed five global themes: (1) Initial Perceptions of the Learning Module, (2) Usefulness of the Learning Module, (3) Impact of Learning Module on Diabetes Regimen Adherence, (4) Hindrances to Diabetes Regimen Adherence, and (5) Overall Feedback and Likelihood of Recommending to Others. Table 2 presents these themes along with their associated sub-themes and representative codes. Preliminary coding of the transcripts

resulted in 38 open codes, grouped into 11 sub-themes, and further structured beneath five main global themes. Results are presented under the global themes together with their supporting significant statements.

Table 1. Socio-demographic Profile of the Interview Participants (N=13)

Variables		Mean ± SD (Range)	
Age	In years	56.62 ± 8.70 (range: 45-88)	
		Frequency (n)	**Percentage (%)**
Sex	Male	2	15.38
	Female	11	84.62
Civil Status	Single	0	0.00
	Married	12	92.31
	Widowed	1	7.69
Highest Educational Attainment	Primary	3	23.08
	Secondary	7	53.85
	Tertiary	2	15.38
	Post-graduate	1	7.69
Religious Affiliation	Catholic	11	84.62
	Other	2	15.38
Employment	Employed	6	46.15
	Unemployed	7	53.85

Global Theme 1: Initial Perceptions of the Learning Module

Participants in the study provided positive feedback on the initial perceptions of the learning module regarding its visual presentation, organization, clarity in localized health education, and relevance to diabetes health education and promotion. They found the module to be highly presentable and well-organized, with clear instructions and comprehensive information. The module's aesthetic appeal and organization were frequently praised, as one participant noted:

> *"It [learning module] is very presentable. The visuals are very well made." (P3, 51 years old, Female)*

The use of the local language was particularly appreciated for enhancing comprehension. Participants further acknowledged the module's alignment with the goals of diabetes health education and promotion, emphasizing its role in guiding users on managing their condition, controlling blood sugar, and providing crucial information that was previously unknown to them:

> *"Yes, it's in Bisaya, so it's very clear in its instructions. You can easily understand what it means." (P13, 60 years old, Male)*

Table 2. Global Themes, Sub-themes, and Open Codes Identified via Reflexive Thematic Analysis

Global Theme 1: Initial Perceptions of the Learning Module	Global Theme 2: Usefulness of the Learning Module	Global Theme 3: Perceived Impact of the Learning Module	Global Theme 4: Hindrances to Diabetes Regimen Adherence	Global Theme 5: Overall Feedback and Likelihood of Recommending to Others
Visual Presentation and Organization Quality	**Empowerment through Diabetes Education and Lifestyle Management**	**Exercise as a Catalyst for Health Improvement and Familial Support**	**Obstacles to Consistent Exercise Adherence**	**Affirmation of Effective Module Content and Guidance**
Satisfaction with Visual Presentation	*Self-Discipline and Control*	*Improved Energy Levels*	*Forgetfulness*	*Learning Module Appreciation*
Module Appearance and Organization	*Perceived Module Usefulness*	*Medication Reduction Aid*	*Disruption of Routine due to Illness or Visitors*	*Sufficient Information Provided*
Clarity and Comprehensiveness in Localized Health Education	*Increased Understanding of Diabetes*	*Weight Reduction*	*Household Chores Prioritization*	*Satisfaction with the Information*
Clarity due to Local Language Used	*Perceived Module Effectiveness*	*Motivated by Family Support*	*Time Constraints*	**Influence of Social Networks on Health Module Recommendations**
Module Comprehensibility	**Preference for Expanded Coverage and Actionable Information**	**Transformation in Dietary Habits through Learning and Family Influence**	*Alternative Exercise Routines*	*Family-centric Health Promotion*
Relevance to Diabetes Health Education and Promotion Program	*Desire for Expanded Coverage*	*Initial Struggles with Portion Control*	***Multifaceted Challenges Impacting Nutritional Adherence***	*Advocacy and Social Support*
Alignment with Purpose		*Motivated by Family Responsibility*	*Difficulty in Portion Control*	*Selective Sharing*
Importance of Learning Module		*Guided Dieting*	*Struggle with Dietary Restrictions*	*Dependent on Individual Readiness*
Awareness of Diabetes Symptoms		*Impact on Food Intake*	*Food Availability*	
			Time Constraints	
			Financial Limitations	
			Laziness	

Note: Sub-themes are in bold and open codes in italic.

Global Theme 2: Usefulness of the Learning Module

Participants highlighted the learning module's role in fostering self-discipline, specifically in managing eating habits, exercising, and following dietary guidelines. As seen in the following excerpts, participants acknowledged a shift in their behaviors, including reduced food intake, increased water consumption, and a newfound awareness of the impact of their dietary choices on their blood sugar levels:

> *"The module helps in the control of eating. To exercise and to eat right. That's how I learned about proper snacking – in the module. I have to cut down [on calories]. I try to follow it [regimen]." (P2, 88 years old, Female)*

> *"The learning module taught me how to discipline myself. I used to eat a lot before, but now I eat less. I drink more water. I used to have high blood sugar, but when I got a checkup, it decreased, so I became confident. I didn't think it was necessary to eat properly anymore because I felt fine. So, I went back to eating a lot. Later, I realized that it [high blood sugar level] can come back because when I had my last check up, my blood sugar was high again." (P10, 57 years old, Female)*

Participants found the exercise and nutrition modules particularly beneficial, recognizing their significance in managing diabetes. They appreciated the guidance provided on nutritious foods, largely on how they aid in preventing health complications related to diabetes:

> *"I like the section on nutritious foods that should be consumed. It greatly helps in preventing problems. Following the suggested diet can control blood sugar and prevent diabetes from worsening." (P10, 57 years old, Female)*

Participants also mentioned experiencing changes in their perception and knowledge about diabetes symptoms and management. They acknowledged the module's role in providing clarity and guidance, enabling them to recognize changes in their health status and take proactive measures:

> *"It has helped me a lot. Because at first, I didn't have any idea. Before I used to have blurry eyesight and I didn't understand it. Now it's [eyesight] clear. I can see that there have been changes since I've started the program. It's not like before when I had no knowledge about diabetes. I had to adjust on my own. Now I know there's a proper way to do it. Because of this learning module, I know what needs to be done." (P10, 57 years old, Female)*

However, one participant expressed the desire for expanded coverage within the learning module, mostly in addressing symptoms or health issues beyond what was initially covered. The following statement reflects a concern about experiencing symptoms not within the scope of the module, indicating a perceived gap in information related to conditions that might be associated with diabetes:

> *"Everything seems to be fine. But sometimes, I feel symptoms that are not found in the learning module. I think it may be [due to] uric acid." (P5, 60 years old, Female)*

Global Theme 3: Perceived Impact of the Learning Module

When asked about diabetes regimen adherence, participants noted the positive impact of the learning module on their exercise habits and overall lifestyle improvement. They reported feeling more energetic and less sleepy, attributing this improvement to regular exercise routines. Family involvement in activities like Zumba further motivated participants to engage in exercise. Moreover, participants observed a reduction in the need for medications due to consistent exercise, leading to improved health and breathing. Exercise also contributed to weight reduction in one participant, while family support served as a significant motivator for adhering to exercise routines as participants expressed a desire to lead a longer life for the sake of their children. The following significant statements point out these findings:

> *"Yes, [the learning module has helped me improve] in a huge way. Because apart from not feeling weak anymore – since in the morning I usually feel very sleepy and weak already, my children do Zumba Zumba too, I try to join them." (P1, 54 years old, Female)*

> *"There were times when I don't need to take medications anymore. Exercise helped me that's what I noticed. That's why I will try to persevere because I have seen the result. I don't struggle to breathe much anymore." (P2, 88 years old, Female)*

> *"It [learning module] has influenced me. If you take exercise seriously, you can reduce weight. Even walking counts as exercise." (P11, 50 years old, Female)*

Considering dietary habits, a few participants initially struggled with adjusting portion control and meal composition, as highlighted in the significant statements. However, they gradually realized the importance of balanced meals in managing diabetes through the learning module. Family influence also played a significant role in motivating participants to adhere to dietary changes, with their responsibility towards family members serving as a crucial inspiration. Participants further acknowledged the module's role in facilitating a realization of the importance of guided dieting by crediting it for shifting their comprehension and approach towards improving their health and well-being:

> *"At first it was hard for me to adjust… Because I don't eat much especially vegetables. Sometimes I can't even have rice for breakfast. So I just eat rice for lunch. Sometimes we have bananas, we can buy sweet potatoes,*

things like that. But now I understand the importance of portion control when eating." (P1, 54 years old, Female)

"It [learning module] helped. I usually overeat and if I don't even have determination for my child, I think I will continue overeating. But it's only for their sake that I can help myself. That's why I control eating. Because we don't have other family members with us since we are not from here. So, we take care of each other because it's just the two of us." (P2, 88 years old, Female)

"Before, I just did whatever I wanted. I didn't know any better. Sometimes, I didn't even have breakfast. But after I started using this learning module, I realized the importance of dieting. It's different now. With a guide I have control. That's what I've learned. It's different from when I didn't have a guide." (P3, 51 years old, Female)

Global Theme 4: Hindrances to Diabetes Regimen Adherence

While many participants found the learning module beneficial in changing their lifestyles and health behaviors, some encountered restrictions in regularly exercising due to various reasons. These included physical discomfort following exercises without warmups, forgetfulness, and a busy schedule, resulting in irregular adherence to the exercise regimen. Disruption to established routines due to visitors or illness also surfaced as eminent obstacles. Additionally, prioritizing heavy household chores over exercise posed a significant challenge, as did time constraints due to childcare responsibilities and daily living tasks. However, some participants adapted exercise routines to suit their preferences or integrated alternative physical activities into their everyday routines, illustrating their efforts to maintain physical activity despite challenges:

"Sometimes I forget. Sometimes, I'm busy. I can't follow everything regularly." (P13, 60 years old, Male)

"Oh yes, those [days without exercise] are when I got sick. I didn't get to do it [exercise]. I also had visitors yesterday." (P3, 51 years old, Female)

"Sometimes I have other things to prioritize. Like earlier, there were heavy household chores, and that's what I had to prioritize. Afterwards, I get too tired. Sometimes my body aches from heavy work. That's why I don't [exercise] sometimes." (P4, 56 years old, Female)

"It's time. Time management. I have a child to take care of. It's tiring to wake up early. There are times I wake up at 4:30 in the morning to exercise for 30 minutes before I cook meals at 5. But I can't do it all the time." (P12, 54 years old, Female)

"

My daughter adapted my exercise regimen so it was easier and I didn't feel too much pressure. I do it every day. But slowly. The first thing is to pace myself. My daughter usually accompanies me during exercises as my guide." (P2, 88 years old, Female)

With regard to hindrances to proper nutrition, some participants encountered multifaceted obstacles impacting their adherence. Accessibility issues – including distance from markets and scarce availability of fruits or vegetables – hampered some participants' ability to follow prescribed dietary suggestions effectively. Financial limitations significantly impacted participants' ability to adhere to prescribed diets as well, with affordability of recommended foods posing a challenge. On days when participants didn't follow recommended dietary changes, some attributed it to laziness or inattentiveness towards dietary recommendations, affecting their adherence:

"It depends on the availability of foods. If certain foods aren't available, you just eat what's there. I try to reduce my rice intake. Not everything can be followed due to the availability of supplies. The recommended foods aren't always available in the community." (P8, 61 years old, Male)

"Maybe the budget. Money. Sometimes, food isn't the top priority. I have a student who needs an allowance. We make do with what's available. When it comes to fruits, we can only afford bananas." (P12, 54 years old, Female)

"I'm just lazy. I forget. I sometimes I don't pay enough attention to this. I would skim through the nutritional advice." (P10, 57 years old, Female)

Global Theme 5: Overall Feedback and Likelihood of Recommending to Others

In spite of certain barriers that hindered regular diabetes regimen adherence to some participants, most expressed overall gratitude for the learning module, acknowledging its pivotal role in providing guidance and structure. The module was perceived as a valuable resource, providing a sense of control and direction in navigating their health journey. They found the module to be comprehensive, informative, and valuable, covering essential aspects related to nutrition and exercise. While personal impediments sometimes inhibited their adherence with the diabetes regimen, participants still expressed overall satisfaction with the module's content indicating that it effectively met their expectations and needs for diabetes education and support. These sentiments can be gleaned from the following excerpts:

"There is nothing more to change as this [learning module] is already nice. That's why I think we are very privileged to be able to participate in this [program]. Honestly. Thank you very much to God. It seems to be part of the guide for us senior citizens." (P2, 88 years old, Female)

"It [learning module] is sufficient for me because I've learned a lot about nutrition and added more to my exercise routine." (P5, 60 years old, Female)

Besides, participants reported that their families, especially children and grandchildren, engaged with the learning module. The module was seen as a supportive medium influencing family members' choices and practices related to exercise and diet. They also described extending the learning module's diabetes recommendations toward their social circles, advocating its use among friends and acquaintances. Participants actively encouraged others to read and follow the module's guidelines, its benefits in understanding health management and preventing high blood sugar issues:

"Yes, they [family members] read it [learning module]. Even my daughter reads it. She said, 'You can do this.' It's easier because we have a guide. Before, I used to have doubts, but now, since I have control, I don't have those doubts anymore." (P3, 51 years old, Female)

"Yes, my grandchildren here are starting to exercise early in the morning. Well, for exercise, it's good for diabetics and weight management. I can share it with others if they're interested or if someone asks. But the learning module is already good." (P13, 60 years old, Male)

"I recommend to others because it [learning module] helps in understanding what's right for our health. It also explains what should be avoided for those with [high blood sugar]. Sharing this with others can help them avoid having high blood sugar too." (P4, 56 years old, Female)

Finally, some selectively shared their learning modules based on perceived relevance to others. They considered the health status of their family members, preferring not to share it with those they deemed unaffected by diabetes. The sharing was targeted towards individuals they believed could benefit from the module's instruction. Another participant professed that advocating the module's use relied on the individual's willingness to comply. They believe that not everyone may readily accept health advice or willingly undergo check-ups due to various personal reasons or resistance to knowing their health status:

"I've shared it, but not to everyone. I didn't give it to my child because they're not diabetic." (P6, 51 years old, Female)

"I would [recommend the learning module], but it depends on their [other people's] willingness. Not everyone can be obliged to follow it. Some people don't want to get a medical check-up to avoid finding out if they have the disease. It really depends on the individual." (P11, 50 years old, Female)

DISCUSSION

This study explored participants' experiences with and perceptions of a community-based diabetes learning module in rural Philippines. The qualitative analysis unveiled five major themes. First, participants expressed positive initial perceptions about the module's visual presentation, organization, and use of local language, highlighting its accessibility and relevance. Second, the module's content and structure were viewed as beneficial in fostering self-discipline and enhancing diabetes knowledge, particularly regarding diet and exercise. Third, participants reported positive impacts on their diabetes regimen adherence, noting improvements in both exercise habits and dietary practices, often motivated by family support. Fourth, several barriers to adherence were disclosed, including time constraints, household responsibilities, and resource limitations, particularly affecting exercise routines and dietary recommendations. Lastly, despite these challenges, participants expressed overall satisfaction with the module and showed willingness to share it with others, though some were selective in their sharing based on perceived relevance to others' health status.

The positive initial perceptions pertaining to the aesthetics and presentation of the learning module suggest that these aspects may have positively impacted engagement and cognition. A visually appealing and well-organized module likely served as a cue to action, prompting participants to engage with the educational material and motivating them to adopt healthier behaviors. This aligns with the Health Belief Model principle that individuals are more likely to take action to prevent a health threat if they perceive the recommended actions as feasible and beneficial.[16] Ensuring visually appealing content, proper message framing, and structured organization can enhance the learning process, potentially leading to improved self-efficacy in managing diabetes.[17] The use of the local language Bisaya may have also facilitated clearer communication and ensured that instructions were easily grasped by participants. This finding reinforces previous research highlighting how localization efforts, such as translating materials into the common language and garnering the participation within the community, augment comprehensibility and inclusivity, thus empowering users to make informed choices about their health.[11]

Furthermore, the learning module appeared instrumental in instilling self-discipline, enhancing awareness of healthy practices, and improving understanding of diabetes management among participants. As part of the health education program, participants were encouraged to embrace adopting healthier behaviors, primarily in connection to diet control and exercise regimens. This approach to patient education is well documented in literature. For instance, Trouilloud and Regnier reported positive changes in glycemic control, and adherence to physical activity and diet after a three-day therapeutic education program, while Aljuhani and co-workers underlined the role of diabetes education in

promoting self-care behaviors, which are crucial for managing the condition.[18,19] The learning module likely heightened participants' perceptions of susceptibility to complications associated with uncontrolled diabetes (e.g., elevated blood sugar levels and hypertension), and the severity of these complications. As Ydirin pointed out in his study of adults at risk for diabetes, health literacy is strongly correlated with health behaviors, suggesting that evidence-based lifestyle interventions should focus on improving awareness of diabetes risks to reduce disease incidence among remote Filipino communities.[20]

Despite the module's perceived benefits, participants encountered various challenges in maintaining adherence to recommended behaviors, with the identified barriers mirroring those found in previous studies.[21–24] This finding also emphasizes the significance of providing versatile strategies to overcome obstacles – such as integrating physical activity into daily tasks – fostering consistent exercise adherence among individuals managing diabetes. Further encouragement and guidance aimed at overcoming these obstructions could enhance regular exercise and contribute to improved diabetes management outcomes.[23,24] Likewise, the influence of familial support and social networks were reported as significant factors in promoting adherence to recommended behaviors. Participants frequently mentioned how family members, particularly children and grandchildren, engaged with the module and supported their lifestyle modifications. This observation aligns with previous research emphasizing the importance of family support systems in diabetes management.[25] Etnier et al. also report the role of social support and intrinsic motivation in promoting exercise adherence among middle-aged and older adults.[26] These results collectively underscore the importance of incorporating familial influence, a nurturing environment, and personal motivation in health education strategies to promote exercise.

In addition, the various matters participants faced while trying to comply with dietary guidelines accentuate the complex interplay of factors influencing nutritional adherence for diabetes management. Issues such as food availability, time restraints, and financial limitations emerged as eminent barriers. Granted that each participant received one-to-one nutrition counseling sessions with a registered nutritionist and dietician, addressing these concerns with adaptable dietary guidelines, as well as enhancing education with regard to meal substitutes and portion control could further mitigate stumbling blocks and better support participants in adhering to diabetes regimens. According to several scholars, personalized strategies that take into account the rural context, financial limitations, and problems related to food availability are crucial to improving dietary adherence.[27,28] Providing more accessible and practical dietary recommendations through the introduction of policies that consider local food availability and affordability can create an enabling environment that might improve adherence as well.[29]

Nevertheless, the overall positive feedback and expressions of gratitude from participants suggest that the learning module had a significant influence on participants' diabetes knowledge and approach to controlling their health. Participants appreciated the module's content, emphasizing its role as a valuable resource in enhancing their understanding of nutrition, exercise, and blood sugar control. This suggests the participants' perceived benefits from engaging with the educational content, which may have strengthened their intentions to adhere to diabetes regimens.[30] Accordingly, affirmations received indicate a high likelihood of recommending the learning module to others, signifying its potential as a beneficial tool in supporting other individuals dealing with diabetes. Such patient education methods have previously been endorsed by earlier works toward improving health beliefs and behaviors, remaining influential for diabetes health program planners to this day.[31–33] The module's development was guided by participants' need to understand proper diabetes management practices, transforming their approach from uncertainty to informed self-care.

Besides, the effect of social networks, predominantly familial circles, in promoting and advocating for the learning module was evident. A number of participants actively shared and recommended the module to family members and friends, thereby denoting its value in educating about diabetes. However, selective sharing and dependency on individual willingness to comply showcased the distinct approach required in advocating health modules, considering the recipients' perceived relevance and readiness to engage with health-related information. Several health behavior models may help explain this phenomenon. According to Ajzen, people tend to share information they believe will be beneficial or relevant to their social circles.[30] Even if the information is valuable, its adoption or recommendation also relies on individuals' interest in health-related content.[34] Factors like cues to action, perceived benefits, or the relevance of the information to one's health journey may further influence this willingness.[35] Therefore, the participants' perception of the module's relevance and their eagerness to get involved with health information can be paramount to their openness to advocate it.

Limitations

This study has several limitations. First, the findings represent experiences from a specific rural Filipino community and may not be fully transferable to other settings. Second, participants' responses might have been influenced by social desirability bias, although efforts were made to encourage honest feedback. Third, it is important to acknowledge that the dynamic milieu of diabetes management requires a multisectoral approach. Relying solely on educational interventions may not address the systemic and environmental factors that contribute to diabetes regimen adherence, such as access to healthcare facilities, medication affordability, and social support networks. A more holistic approach that

encompasses policy changes, economic stability, and community engagement may be essential to create long-lasting improvements in diabetes management within rural Filipino communities.

Future research could explore long-term sustainability of behavioral changes initiated through the module, effectiveness of similar modules in different cultural contexts, strategies to address identified barriers to adherence, and ways to better integrate family support into diabetes education programs. Notwithstanding, the BSBDM pilot initiative offers lessons for future iterations involving its stakeholders, and discernment gathered can be used to inform ensuing research in the field. Recognizing these limitations reinforces the necessity of conducting evaluation studies for refining community-based interventions to maximize their impact in the community.

CONCLUSION

This qualitative inquiry into participants' experiences with the community-based diabetes learning module revealed several key insights. Participants' initial perceptions highlighted the module's strong visual appeal and accessibility, particularly appreciating its use of local language and clear presentation. Regarding useful aspects, participants valued the comprehensive coverage of diabetes management, especially sections on diet and exercise. The module's perceived impact on regimen adherence was also evident through participants' reported improvements in self-discipline and health practices that were often motivated by family support. However, significant barriers to adherence emerged, including time constraints, resource limitations, and competing priorities, emphasizing the need for more enduring individualized support and resources in the community to address these barriers. Despite these challenges, participants expressed strong satisfaction with the module and willingness to share it with others, though sharing decisions were often based on perceived relevance to others' health status. These findings contribute to the local body of knowledge that community-based learning modules can serve as valuable educational tools for diabetes care in rural Filipino communities when designed with attention to the vernacular, culture, and context. Hereafter health programs can benefit from these lessons to better aid individuals in managing their condition and improving overall health outcomes. By incorporating responsive strategies and individualized approaches, diabetes learning modules can be implemented to better meet the unique needs and hurdles faced by rural Filipinos.

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Data Availability

Data for this study is available from the corresponding author upon reasonable request.

Statement of Authorship

Both authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

Both authors declared no conflicts of interest.

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